

Counterpoint Global Insights

Case Study: CRISPR

EDGE | JANUARY 2017

WELCOME TO THE EDGE.

Morgan Stanley Investment Management's Counterpoint Global shares their proprietary views on a big idea that has the potential to trigger far-reaching consequences—ideas such as autonomous vehicles, artificial intelligence, robotics and bioengineering.

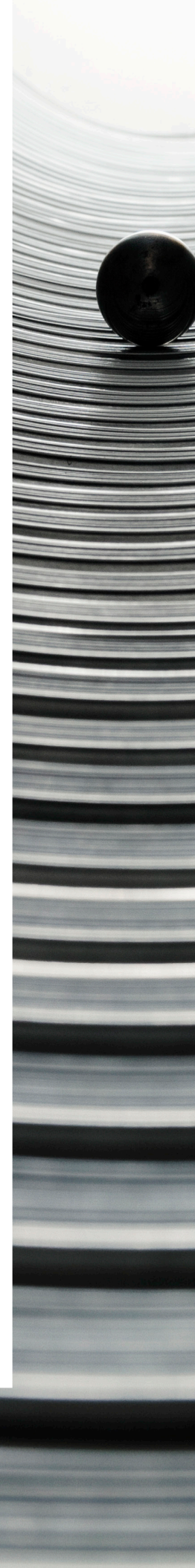
Counterpoint Global's long-term ownership mindset emphasizes perspective, insight and thinking across categories, while our investment process focuses on identifying unique companies with sustainable competitive advantages. Through The EDGE, we share our framework for thinking about change and our process for recognizing patterns that may drastically alter the investment landscape over the longer term.

This work complements our team's more traditional, fundamental research to create a framework for long-term investing that is grounded in intellectual curiosity and flexibility, perspective, self-awareness and partnership.

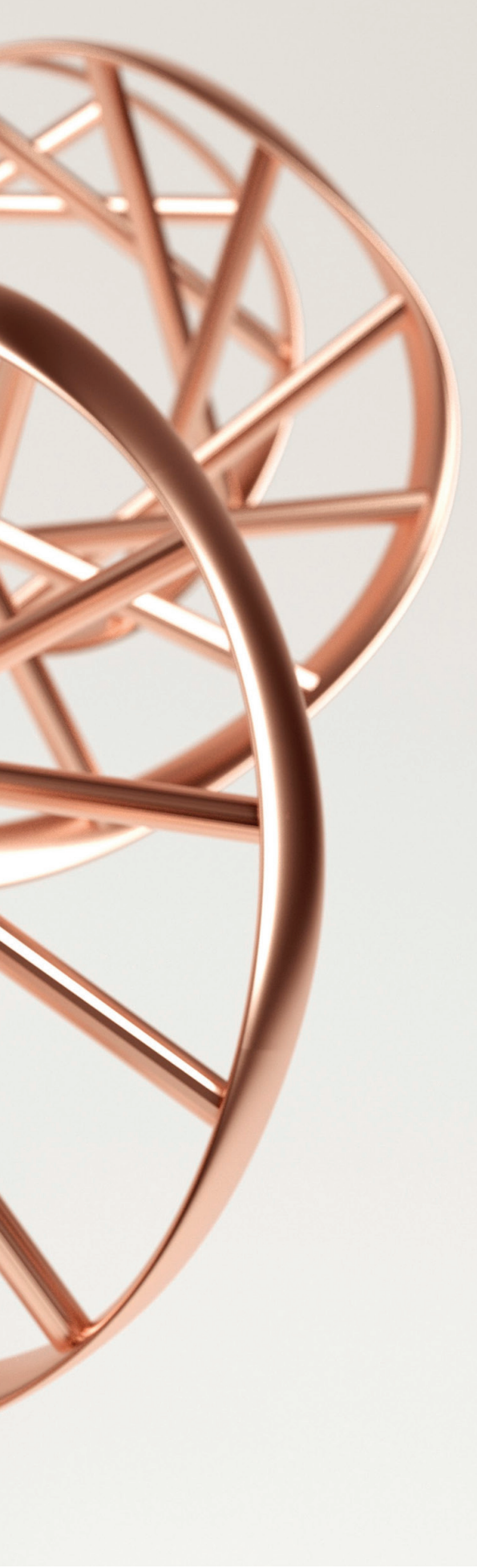
Clustered regularly interspaced short palindromic repeats (CRISPR) is a new tool for genetic research that allows scientists to locate specific segments of DNA and then replace or delete those segments. It enables scientists to alter organisms for either therapeutic or research purposes, both before and after they have developed. For investors, it has the potential to birth new industries and disrupt existing medical treatments.

CRISPR is a string of DNA that was originally discovered as part of a bacterium's immune system. Using this simple string of DNA, bioengineers figured out how to repurpose the immune system to have it target select strands of human, animal or plant DNA instead of the natural threats to bacteria. They can thus locate specific portions of a human genome—the blueprint of the human body. Cells use DNA, which is the language of the blueprint, to construct organs and enable the various functions of the body. CRISPR allows scientists to read, write and edit this blueprint. ▶

The views and opinions and/or analysis expressed herein are those of the investment team as of the date of preparation of this material, are subject to change at any time without notice due to market or economic conditions, and may not necessarily come to pass.







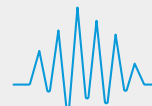
► This breakthrough creates an opportunity for innovations to flourish. Some of the first applications of CRISPR have been in agriculture, where genetic modifications are being made to crops. Imagine an apple that doesn't brown or crops that are mildew resistant. For diseases caused by known faulty mutations—"typos" in the three-billion letter sequence of the human genome—such as cystic fibrosis, hemophilia and Tay-Sachs disease, CRISPR offers therapeutic opportunities. Once the "typos" are located, they can either be excised or altered. This treatment could radically disrupt existing therapeutics, many of which treat symptoms rather than underlying causes. The technology can even be used to target viruses, such as HIV. Such disruption would be a detriment to the annuity streams of many pharmaceutical companies. More utopian or dystopian is the possibility of "designer babies"—allowing parents to choose the traits and qualities they want in their children.

This breakthrough creates an opportunity for innovations to flourish.

To be sure, there are a number of causes for doubt. Ethical questions could bring on regulatory scrutiny. There is also legal uncertainty over the intellectual property; the Supreme Court and Congress may have to clarify the patentability of CRISPR. Finally, science is generally incremental, and there are few paradigm shifts that change things overnight.

CRISPR is still in its early stages, with the first clinical trial receiving approval in June 2016. Short of some miracle breakthrough, it could be years before treatments are approved. Other segments, like agriculture, may move faster.

We will continue to monitor the scientific and clinical research that is being conducted and are mindful of the tremendous potential here.



OTHER DISRUPTORS

Other themes the team is currently researching include

- Blockchain
- Machine Learning
- Autonomous Vehicles

Risk Considerations

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Counterpoint Global

New York

INVESTORS	RESEARCH RESPONSIBILITIES	YEARS OF EXPERIENCE	YEARS WITH FIRM	YEARS WITH TEAM
DENNIS LYNCH	Lead Investor, Head of Counterpoint Global	28	24	24
SAM CHAINANI	Head of Counterpoint Global ~ New York, Technology	26	26	22
JASON YEUNG	Health Care	25	20	18
ARMISTEAD NASH	Business Services, Software	22	20	18
DAVID COHEN	Consumer	34	29	23
ALEX NORTON	Consumer, Industrials, Technology (ex Software)	27	22	22
MANAS GAUTAM	Head of Global Endurance, Generalist	10	7	7
ANNE EDELSTEIN	Health Care	11	4	4
ABHIK KUMAR	Software, Media	13	3	3
JENNY LEEDS	Healthcare	6	3	3
JOSHUA JARRETT	Director of Research, Generalist	17	2	2
RUOBING CHANG	Internet	10	6	2
ALEKS SAMETS	Payments	2	2	2
BETH FIFER	Health Care	10	1	1
MUHAMMADRAZA PANJU	Internet	3	1	1
PETE STOVELL	Generalist	28	1	1
LIZ HALL	Blockchain, Cryptocurrency, Gaming	15	<1	<1
MICHAEL MORITZ	Generalist	4	<1	<1
CONSILIENT RESEARCH				
MICHAEL MAUBOUSSIN	Head of Consilient Research	35	2	2
DAN CALLAHAN	Consilient Research	17	2	2
DISRUPTIVE CHANGE RESEARCH				
STAN DELANEY	Big Ideas, Emerging Themes	21	21	18
SASHA COHEN	Big Ideas, Emerging Themes	5	5	5
JUSTIN AMEZQUITA	Big Ideas, Emerging Themes	2	2	2
VASILEIOS PRASSAS	Big Ideas, Emerging Themes	8	1	1
SUSTAINABILITY RESEARCH				
THOMAS KAMEI	Head of Sustainability Research, Internet	10	10	10
DERRICK MAYO	Sustainability Research	17	8	1
CLIENT RELATIONSHIP AND BUSINESS MANAGEMENT				
MARK TODTFELD	Chief Operating Officer	27	17	3
KERRY ANN JAMES	Head of Client Relations, Portfolio Specialist	25	5	1
PRAJAKTA NADKARNI	Portfolio Specialist	18	15	11
MICK MORAN	Portfolio Specialist	8	8	<1
MCKENZIE BURKHARDT	Portfolio Specialist	19	19	19
XAVIER SALAZAR	Portfolio Analyst	4	4	<1
KATHRYNE DOWNS	Portfolio Specialist ~ Global Endurance	10	10	<1
EARL PRYCE	Portfolio Administrator	22	22	15
CHAYSE MORGAN	Portfolio Administrator	2	2	2
ERICA CASARENO	Portfolio Administrator	<1	<1	<1
AMBER YOUNG	Business Management	12	4	1

Asia

Global, International, Asia

KRISTIAN HEUGH Lead Investor, Head of Global Opportunity

- 11 Investors, 5 Portfolio Specialists, 1 Portfolio Operations Analyst

"Investor" refers to an analyst or portfolio manager of Counterpoint Global.

Counterpoint Global members may change without notice from time to time. Years of Experience listed above refers to Industry Experience.

Years of Experience, Years with Firm and Years with Team are as of September 2022.

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